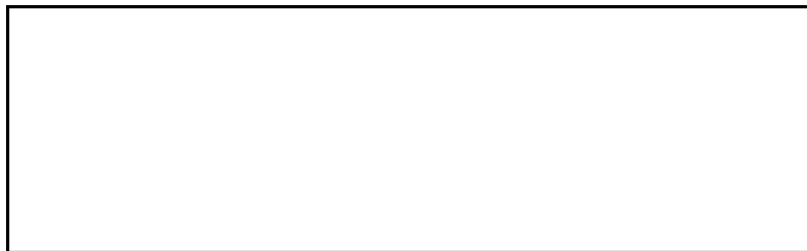


970200

STAT



May 3, 1966

U. S. Government  
Washington, D.C.

STAT

Reference:  Task #03  
Task #36

Dear Sir:

Enclosed are three copies of the following disclosure of invention which comes within the provisions of the subject contracts;

STAT

 *Processing*  
"System for Electronically Pressing Photographic Images"

STAT

Also enclosed is a copy of  NOTICE OF INTENTION NOT TO FILE  
AN APPLICATION FOR PATENT for the above identified disclosure.

STAT

Very truly yours,



Government Contract Invention Records  
Patent Operations

LJR:fcs  
Enclosures: a/s

NGA Review Complete

[Redacted Box]

STAT

NOTICE OF INTENTION NOT TO FILE AN APPLICATION FOR PATENT

[Redacted Box] DOCKET NO: 57,520

INVENTOR(S):

[Redacted Box]

*Processing*

TITLE: SYSTEM FOR ELECTRONICALLY PRESSING PHOTOGRAPHIC  
IMAGES

GOVERNMENT

[Redacted Box]

STAT

STAT

1. A novelty search (~~was~~) (was not) made.
2. The best known prior art (or reference of interest):  
  
None known.
3. Known publication or presentation, intended publication or presentation, or public use of the invention is as follows:  
  
None known.
4. The invention (~~is~~) (is not) incorporated in equipment built and/or delivered or to be delivered under the contract. Date: \_\_\_\_\_  
The model number is (if known): \_\_\_\_\_
5. Other pertinent comments which are believed will be of value to the Government Agency:  
  
No comments.

6. Attached are facsimile <sup>3</sup> copy(ies) of the disclosure papers required by the Government.
7. ALL FUTURE CORRESPONDENCE AND DEALINGS CONCERNING THE ABOVE IDENTIFIED DISCLOSURE MUST BE ADDRESSED TO THE ATTENTION OF

[Redacted Box]

STAT

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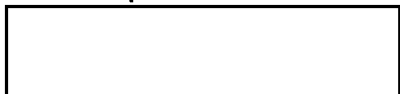
**PATENT DISCLOSURE DATA SHEET**

Approved For Release 2004/08/25 : CIA-RDP78B04770A000600010008-8

For Patent Operations Use Only  
(Date Received) 5-7-52  
Docket No. 3-1-66  
Domestic Patents M  
Attorney: [Redacted]  
Filing: [Redacted]

**STAT**  
**STAT**  
**STAT**

To: Patent Operations



The herein described invention is submitted pursuant to my employment agreement.

1. Date of this disclosure: Feb. 22, 1966
2. DESCRIPTIVE TITLE: System for Electronically Processing Photographic Images
3. PURPOSE, SUMMARY AND PROBABLE USES: To process photographic images so as to improve their perceptibility to human observers. The system employs a single kinescope with mixed phosphors in an open loop feedback system to produce modulated light for contact reproduction of the images. Another kinescope is used for monitoring the light mask for adjustment purposes. The probable use of the system is as a modulated light contact printer.

Answer All Questions — Use N/A when Not Applicable — Submit Original — Keep Copy for Your Files

4. Attached hereto is "Detailed Description" comprising Form Pat. 3010 ( 45) pages and the following papers, prints, samples, etc. — Fig. 1
5. Invention described in part 11/2, 1964 in Engineering Notebook No. 19932 Pages 88
6. Device constructed on \_\_\_\_\_, 19\_\_\_\_ 7. Shop Order # \_\_\_\_\_
8. Tested on \_\_\_\_\_, 19\_\_\_\_ 9. Test Witnessed by \_\_\_\_\_  
Bldg \_\_\_\_\_ Flr. \_\_\_\_\_ City and State \_\_\_\_\_ Tel. Ext. \_\_\_\_\_
10. State any plans for use of the invention May be implemented based on a future proposal.  
May be of interest to Graphic Systems Division of [Redacted] **STAT**
11. If this invention has been described in any publication or report, identify: \_\_\_\_\_
12. Was invention either (a) conceived or (b) first actually reduced to practice in the course of or under Government Contract(s) or Subcontract(s)? (a) Yes x No \_\_\_\_\_ If "Yes," give date: Nov. \_\_\_\_\_, 1965  
(b) Yes \_\_\_\_\_ No \_\_\_\_\_ If "Yes," give date: \_\_\_\_\_, 19\_\_\_\_ (See explanation on reverse side)
13. If answer either to 12(a) or 12(b) is "Yes" list contract(s) or subcontract(s) numbers:  
(a) [Redacted] (b) [Redacted] **STAT**
14. Is the invention embodied in any material either (a) furnished or (b) to be furnished under Government Contract(s) or Subcontract(s)? (a) Yes \_\_\_\_\_ No x (b) Yes \_\_\_\_\_ No x Proposal maybe submitted and later answer may be "yes".
15. If answer either to 14(a) or 14(b) is "Yes" list contract(s) or subcontract(s) numbers:  
(a) \_\_\_\_\_ (b) \_\_\_\_\_
16. Security classification of the Invention Not classified.  
(If any part of this disclosure is classified, the disclosure should be appropriately stamped and transmitted under security procedures.)

STAT

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**T**  
**Y**  
**P**  
**E**  
**or**  
**P**  
**R**  
**I**  
**N**  
**T**

17. (1) Full Name \_\_\_\_\_ Citizen of USA  
Home Address \_\_\_\_\_  
Bldg. No. 3 Flr. B City & State \_\_\_\_\_  
Occupation No. 22583 Occupation Title Research Engineer

(2) Full Name \_\_\_\_\_ Citizen of \_\_\_\_\_  
Home Address \_\_\_\_\_  
Bldg. No. \_\_\_\_\_ Flr. \_\_\_\_\_ City & State \_\_\_\_\_ Tel. Ext. \_\_\_\_\_

**STAT**

**STAT**

18. Sign full name(s) (1) [Redacted] (2) Feb 22 1966

**SPACE BELOW RESERVED FOR WITNESS**

(An effort should be made to obtain the signature of the person to whom the inventor(s) first disclosed the invention)

19. The invention was first explained to me by the above identified inventor(s) on 22 February, 1966 and is understood by me [Redacted]

Signature of Witness [Redacted] Date of Signature 24 February, 1966

Name of Witness (Type or print) [Redacted]

Location: City & State [Redacted] Bldg. \_\_\_\_\_ Flr. \_\_\_\_\_ Tel. Ext. \_\_\_\_\_

**STAT**

Approved For Release 2004/08/25 : CIA-RDP78B04770A000600010008-8

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Approved For Release 2004/08/25 : CIA-RDP78B04770A000600010008-8

PAGE 2

## PATENT DISCLOSURE DATA SHEET

STAT

DESCRIPTIVE TITLE: System For Electronically Processing Photographic Images.

3. DETAILED DESCRIPTION: This system evolved as a result of a study of ways to fulfill the requirements of Project 36 and its extension, the present PIP program.

The system to be described is similar to that described in [ ] Docket #55788 except that it is a printer (9 in. x 9 in. or larger) rather than a small area viewer. A second kinescope is used to monitor the printing process.

In automatic dodging systems using a kinescope for the modulated light source it has been customary to use negative feedback in a closed loop system to provide the necessary negative light mask. Such systems are limited as to the resolution of the light mask because the video bandwidth of the system must be kept low to prevent system oscillation. A few hundred kilohertz is usually the top frequency used; see the [ ] sales publication. The problem could be minimized using a very low TV frame scanning rate as in slow scan TV systems, but this makes the printer operate too slowly for its intended use.

Wide band, higher speed systems have been disclosed, see [ ] docket #55788, using time sharing on a line by line basis and has the advantage of inherently good registration between the light mask and the transparency which produced it.

Similar systems have been disclosed, see [ ] docket #56280, using two more kinescopes in systems which require precise registration of the scanning rasters. Such systems are also described in [ ] pages III-1 and III-3, and in the First Interim Technical Report, issued Dec. 16, 1965 prepared for the U.S. Government [ ] Task Order #03(100,762)65-R, by the [ ]

Please refer to Fig. 1. As may be observed, this system has no projection lenses, mirrors, or light splitters. Both sensing and modulating are done in one kinescope using the same scanning raster for both. The kinescope is one large enough to accommodate a 9 in. x 9 in. transparency, diagonal 12.6 in.; say, a 14 in. diameter tube, or larger, round or square. On the face is a mixture of phosphor consisting of the yellow component of silicate P-4 and P-16 in the ratio of about 10 of yellow to 1 of violet, but this ratio is not critical. It depends on the exposure characteristics of the un-exposed film to be used in the printer.

The faceplate of the kinescope on which the phosphor mixture\* is deposited in a fiber optic one, ground flat, and made with 1000 fibers to the inch, more or less.

The transparency to be contact printed is placed in direct contact with the fiber optic faceplate, emulsion side out. The unexposed film is placed in contact with the transparency, emulsion to emulsion, and the MPT (multiplier phototube) head including the light condensing system is made to rest upon them, pressing them tightly together. Pressure pads may be used but good results have been achieved over smaller areas without them.

\*It may be a homogeneous mixture or a layer process. The [ ] Tube Division has made 5 in. diam. tubes on standard faceplates which worked as part of Project 36.

Signature(s) of Inventor(s)

Date

Feb 22, 1966

24 February 1966

Date

(For Patent Operations Use Only)

Approved For Release 2004/08/25 : CIA-RDP78B04770A000600010008-8

STAT

**PATENT DISCLOSURE DATA SHEET**

STAT

DESCRIPTIVE TITLE: System for Electronically Processing Photographic Images.**3. DETAILED DESCRIPTION:**

A negative mask is used for the modulated light source according to well known dodging techniques, although a positive mask or a combination of the two could be used.

An advantage of the time sharing principle, to be described next, is that the feedback loop is never closed, thus, oscillations due to overall feedback cannot take place. Another advantage is that the video delay line may be made  $H-X$ , where  $H$  is the time of one scanning line and  $X$  is the overall system delay. Thus the system delay in the horizontal direction is compensated. Vertical compensation is described later.

Although the TV frame rate should be as high as possible, consistent with operating speed, flicker is no problem here as it is in a viewer. The frame rate may, therefore, be less than 60 per second. This makes for higher vertical resolution based on a given horizontal resolution and bandwidth.

The time sharing principle is, as follows: During scan #1, no modulation appears on the kinescope because the delay line delays for that time. During scan #2 the input to the delay line is cut off and the result of scan #1 appears as modulation on the kinescope. It is assumed that during scan #1 the kinescope brightness is lower than for scan #2 so that the sensing scan does less exposing than the modulated scan. During scan #2 the vertical centering is shifted upward an amount equal to the distance between lines so that scan #2 retraces the path of scan #1.

Scan #3 comes in at its normal position, senses the picture similar to #1, and scan #4 retraces scan #3, etc. Thus, only half the number of scanning lines is available for vertical resolution as if no shifting took place. In a system with resolution of 1000 lines to the inch or more, the vertical misregistration error due to not shifting alternate lines would be so low as to not affect the image perceptibility improvement appreciably, but for lower resolution shifting would be desirable.

Vertical and horizontal rates, based on conventional sawtooth scanning, on which this disclosure is based, are chosen so that the resolution is equal in both directions. The maximum mask resolution required for dodging high resolution transparencies is under study with the present laboratory bread-board setup of the two kinescope registered system. Having determined this, the other parameters fall in line in this order: (1) Kinescope spot size, (2) system bandwidth, (3) horizontal scanning rate, and (4) vertical scanning rate.

If after following this technique, line structure appears in the printed copy, the vertical frame rate may be reduced an additional amount, increasing the number of scanning lines to the point where they are indistinguishable, or vertical spot wobble may be used. A higher rate with reduced vertical resolution may be used for preliminary adjustment purposes.

The 2nd scan gate circuitry and a way of scanning each line twice is described in  docket 55788.

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Date

(For Patent Operations Use Only)

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WITNESSED AND UNDERSTOOD BY

STAT

Approved For Release 2004/08/25 : CIA-RDP78B04770A000600010008-8

PAGE 4

**PATENT DISCLOSURE DATA SHEET**

STAT

**DESCRIPTIVE TITLE:** System For Electronically Processing Photographic Images.

**3. DETAILED DESCRIPTION:**

The monitor kinescope for adjustment purposes may be one having essentially the same electrical and brightness characteristics as the main kinescope.

System Advantages

1. Inherently good registration in a simple, compact mechanical design.
2. Higher operating speed than in low bandwidth systems.
3. Higher resolution mask capability than in lower bandwidth systems.
4. Provision for additional enhancing without system oscillation.
5. Correction for system delay.

System disadvantages

1. Cost. The fiberoptic faceplate and the wide band video delay line are both expensive.
2. Lack of individual brightness controls of the two phosphor brightnesses not present in the two kinescope systems.

It seems to me, without having implemented exactly the system disclosed, that the advantages outweigh the disadvantages.

STAT

Date

*Feb 22, 1966*

(For Patent Operations Use Only)

STAT

WITNESSED AND UNDERSTOOD BY

STAT

Approved For Release 2004/08/25 : CIA-RDP78B04770A000600010008-8

*24 February 1966*



STAT

Approved For Release 2004/08/25 : CIA-RDP78B04770A000600010008-8

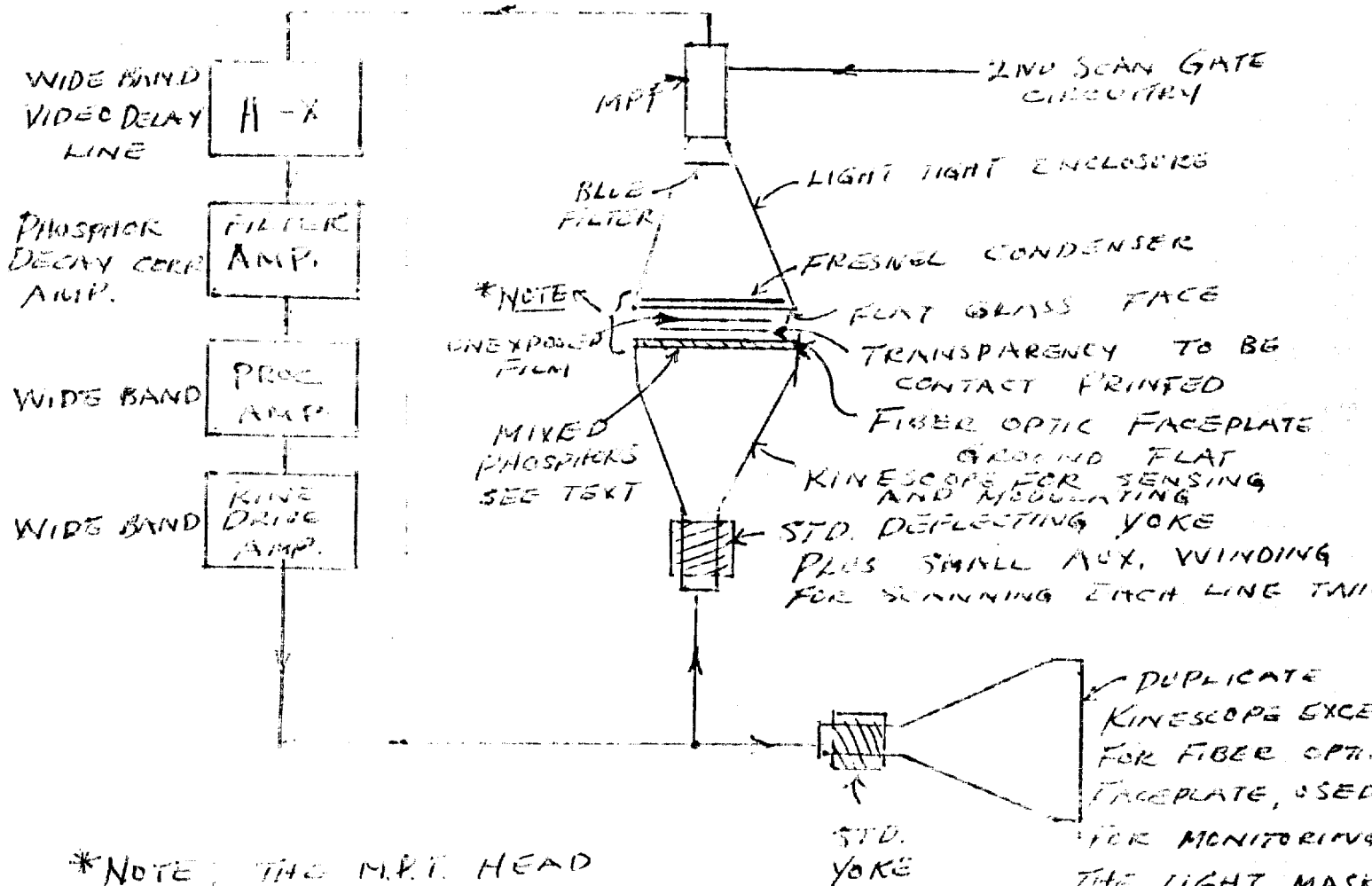
PAGE 5

## PATENT DISCLOSURE DATA SHEET

STAT

DESCRIPTIVE TITLE: *System for Electronically Processing photographic images*

## 3. DETAILED DESCRIPTION:



\*NOTE: THE M.P.T. HEAD  
RESTS ON THE KINE. FACE  
PLATE PRESSING THE UNEXPOSED  
FILM AND TRANSPARENCY TOGETHER.  
FOR OTHER DETAILS SEE

DOCKET # 55788

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FIG. 1

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WITNESSED AND UNDERSTOOD BY

Date

Feb 22, 1966

Date

27 February 1966

(For Patent Operations Use Only)

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## PATENT DISCLOSURE DATA SHEET

Approved For Release 2004/08/25 : CIA-RDP78B04770A000600010008-8

For Patent Operations Use Only (Do Not Fill In Unless Invented by or for the Government and Atty. Assignment)

Date Received)

Docket No. 571529

Date:

Domestic Patents M

Patent Attorney:

STAT  
STAT  
STAT  
STAT

The herein described invention is submitted pursuant to my employment agreement.

1. Date of this disclosure: Feb. 22, 1966
2. DESCRIPTIVE TITLE: System for Electronically Processing Photographic Images
3. PURPOSE, SUMMARY AND PROBABLE USES: To process photographic images so as to improve their perceptibility to human observers. The system employs a single kinescope with mixed phosphors in an open loop feedback system to produce modulated light for contact reproduction of the images. Another kinescope is used for monitoring the light mask for adjustment purposes. The probable use of the system is as a modulated light contact printer.

Answer All Questions — Use N/A when Not Applicable — Submit Original — Keep Copy for Your Files

4. Attached hereto is "Detailed Description" comprising Form Pat. 3010 ( 45) pages and the following papers, prints, samples, etc. — Pic. 1
5. Invention described in part 11/2, 1964 in Engineering Notebook No. 19932 Pages 88
6. Device constructed on \_\_\_\_\_, 19\_\_\_\_. 7. Shop Order # \_\_\_\_\_
8. Tested on \_\_\_\_\_, 19\_\_\_\_. 9. Test Witnessed by \_\_\_\_\_  
Bldg \_\_\_\_\_ Flr. \_\_\_\_\_ City and State \_\_\_\_\_ Tel. Ext. \_\_\_\_\_
10. State any plans for use of the invention May be implemented based on a future proposal.  
May be of interest to Graphic Systems Division of \_\_\_\_\_
11. If this invention has been described in any publication or report, identify: \_\_\_\_\_
12. Was invention either (a) conceived or (b) first actually reduced to practice in the course of or under Government Contract(s) or Subcontract(s)? (a) Yes ☒ No \_\_\_\_\_ If "Yes," give date: Nov. \_\_\_\_\_, 19 65.  
(b) Yes \_\_\_\_\_ No \_\_\_\_\_ If "Yes," give date: \_\_\_\_\_, 19\_\_\_\_ (See explanation on reverse side)
13. If answer either to 12(a) or 12(b) is "Yes" list contract(s) or subcontract(s) numbers:  
(a) \_\_\_\_\_ No. 03 (b) (100,762)65-R
14. Is the invention embodied in any material either (a) furnished or (b) to be furnished under Government Contract(s) or Subcontract(s)? (a) Yes \_\_\_\_\_ No ☒ (b) Yes \_\_\_\_\_ No ☒ Proposal maybe submitted and later answer may be "yes".
15. If answer either to 14(a) or 14(b) is "Yes" list contract(s) or subcontract(s) numbers:  
(a) \_\_\_\_\_ (b) \_\_\_\_\_
16. Security classification of the Invention Not classified.  
(If any part of this disclosure is classified, the disclosure should be appropriately stamped and transmitted under security procedures.)

17. (1) Full Name \_\_\_\_\_ Citizen of USA  
Home Address \_\_\_\_\_  
Street \_\_\_\_\_ City \_\_\_\_\_ County \_\_\_\_\_ State \_\_\_\_\_  
Occupation No. 22583 Occupation Title Research Engineer  
(2) Full Name \_\_\_\_\_ Citizen of \_\_\_\_\_  
Home Address \_\_\_\_\_  
Street \_\_\_\_\_ City \_\_\_\_\_ County \_\_\_\_\_ State \_\_\_\_\_  
Div. or Subsidiary \_\_\_\_\_ Bldg. No. \_\_\_\_\_ Flr. \_\_\_\_\_ City & State \_\_\_\_\_ Tel. Ext. \_\_\_\_\_  
Occupation No. \_\_\_\_\_ Occupation Title \_\_\_\_\_

18. Sign full name(s) (1) \_\_\_\_\_ (2) Feb 22, 1966

## SPACE BELOW RESERVED FOR WITNESS

(An effort should be made to obtain the signature of the person to whom the inventor(s) first disclosed the invention)

19. The invention was first explained to me by the above identified inventor(s) on 22 February \_\_\_\_\_, 19 66 and is understood by me \_\_\_\_\_  
Signature of Witness \_\_\_\_\_ Date of Signature 24 February \_\_\_\_\_, 1966  
Name of Witness (Type or print) \_\_\_\_\_  
Location: City & State \_\_\_\_\_

Approved For Release 2004/08/25 : CIA-RDP78B04770A000600010008-8

STAT



STAT

Approved For Release 2004/08/25 : CIA-RDP78B04770A000600010008-8

PAGE 2

## PATENT DISCLOSURE DATA SHEET

STAT

DESCRIPTIVE TITLE: System for Electronically Processing Photographic Images.

3. DETAILED DESCRIPTION: This system evolved as a result of a study of ways to fulfill the requirements of Project 36 and its extension, the present PIP program.

The system to be described is similar to that described in ☐ Docket #55788 except that it is a printer (9 in. x 9 in. or larger) rather than a small area viewer. A second kinescope is used to monitor the printing process.

In automatic dodging systems using a kinescope for the modulated light source it has been customary to use negative feedback in a closed loop system to provide the necessary negative light mask. Such systems are limited as to the resolution of the light mask because the video bandwidth of the system must be kept low to prevent system oscillation. A few hundred kilohertz is usually the top frequency used; see the ☐ sales publication. The problem could be minimized using a very low TV frame scanning rate as in slow scan TV systems, but this makes the printer operate too slowly for its intended use.

Wide band, higher speed systems have been disclosed, see ☐ docket #55788, using time sharing on a line by line basis and has the advantage of inherently good registration between the light mask and the transparency which produced it.

Similar systems have been disclosed, see ☐ docket #56280, using two or more kinescopes in systems which require precise registration of the scanning rasters. Such systems are also described in ☐ pages III-1 and III-3, and in the First Interim Technical Report, issued Dec. 16, 1965 prepared for the U.S. Government ☐ Task Order #03(100,762)65-R, by the ☐.

Please refer to Fig. 1. As may be observed, this system has no projection lenses, mirrors, or light splitters. Both sensing and modulating are done in one kinescope using the same scanning raster for both. The kinescope is one large enough to accommodate a 9 in. x 9 in. transparency, diagonal 12.6 in.; say, a 14 in. diameter tube, or larger, round or square. On the face is a mixture of phosphor consisting of the yellow component of silicate P-4 and P-16 in the ratio of about 10 of yellow to 1 of violet, but this ratio is not critical. It depends on the exposure characteristics of the un-exposed film to be used in the printer.

The faceplate of the kinescope on which the phosphor mixture\* is deposited in a fiber optic one, ground flat, and made with 1000 fibers to the inch, more or less.

The transparency to be contact printed is placed in direct contact with the fiber optic faceplate, emulsion side out. The unexposed film is placed in contact with the transparency, emulsion to emulsion, and the MPT (multiplier phototube) head including the light condensing system is made to rest upon them, pressing them tightly together. Pressure pads may be used but good results have been achieved over smaller areas without them.

\*It may be a homogeneous mixture or a layer process. The ☐ Tube Division has made 5 in. diam. tubes on standard faceplates which worked as part of Project 36.

Signature(s) of Inventor(s) /

Date

Feb 22, 1966

WITNESSED AND UNDERSTOOD BY

Signature of witness

Date

24 February 1966

(For Patent Operations Use Only)

Approved For Release 2004/08/25 : CIA-RDP78B04770A000600010008-8

STAT

STAT

STAT

Approved For Release 2004/08/25 : CIA-RDP78B04770A000600010008-8

PAGE 3

## PATENT DISCLOSURE DATA SHEET

57,520 STAT

DESCRIPTIVE TITLE: System for Electronically Processing Photographic Images.

## 3. DETAILED DESCRIPTION:

A negative mask is used for the modulated light source according to well known dodging techniques, although a positive mask or a combination of the two could be used.

An advantage of the time sharing principle, to be described next, is that the feedback loop is never closed, thus, oscillations due to overall feedback cannot take place. Another advantage is that the video delay line may be made H-X, where H is the time of one scanning line and X is the overall system delay. Thus the system delay in the horizontal direction is compensated. Vertical compensation is described later.

Although the TV frame rate should be as high as possible, consistent with operating speed, flicker is no problem here as it is in a viewer. The frame rate may, therefore, be less than 60 per second. This makes for higher vertical resolution based on a given horizontal resolution and bandwidth.

The time sharing principle is, as follows: During scan #1, no modulation appears on the kinescope because the delay line delays for that time. During scan #2 the input to the delay line is cut off and the result of scan #1 appears as modulation on the kinescope. It is assumed that during scan #1 the kinescope brightness is lower than for scan #2 so that the sensing scan does less exposing than the modulated scan. During scan #2 the vertical centering is shifted upward an amount equal to the distance between lines so that scan #2 retraces the path of scan #1.

Scan #3 comes in at its normal position, senses the picture similar to #1, and scan #4 retraces scan #3, etc. Thus, only half the number of scanning lines is available for vertical resolution as if no shifting took place. In a system with resolution of 1000 lines to the inch or more, the vertical misregistration error due to not shifting alternate lines would be so low as to not affect the image perceptibility improvement appreciably, but for lower resolution shifting would be desirable.

Vertical and horizontal rates, based on conventional sawtooth scanning, on which this disclosure is based, are chosen so that the resolution is equal in both directions. The maximum mask resolution required for dodging high resolution transparencies is under study with the present laboratory bread-board setup of the two kinescope registered system. Having determined this, the other parameters fall in line in this order: (1) Kinescope spot size, (2) system bandwidth, (3) horizontal scanning rate, and (4) vertical scanning rate.

If after following this technique, line structure appears in the printed copy, the vertical frame rate may be reduced an additional amount, increasing the number of scanning lines to the point where they are indistinguishable, or vertical spot wobble may be used. A higher rate with reduced vertical resolution may be used for preliminary adjustment purposes.

The 2nd scan gate circuitry and a way of scanning each line twice is described in  docket 55788.

Signature of Inventor(s)

Date

(For Patent Operations Use Only)

WITNESSED AND UNDERSTOOD BY

Date

Approved For Release 2004/08/25 : CIA-RDP78B04770A000600010008-8

STAT

STAT

Approved For Release 2004/08/25 : CIA-RDP78B04770A000600010008-8

PAGE 4

## PATENT DISCLOSURE DATA SHEET

STAT

DESCRIPTIVE TITLE: System for Electronically Processing Photographic Images.

## 3. DETAILED DESCRIPTION:

The monitor kinescope for adjustment purposes may be one having essentially the same electrical and brightness characteristics as the main kinescope.

System Advantages

1. Inherently good registration in a simple, compact mechanical design.
2. Higher operating speed than in low bandwidth systems.
3. Higher resolution mask capability than in lower bandwidth systems.
4. Provision for additional enhancing without system oscillation.
5. Correction for system delay.

System disadvantages

1. Cost. The fiber optic faceplate and the wide band video delay line are both expensive.
2. Lack of individual brightness controls of the two phosphor brightnesses not present in the two kinescope systems.

It seems to me, without having implemented exactly the system disclosed, that the advantages outweigh the disadvantages.

STAT

Signature(s) of Inventor(s)

Date

Feb-22, 1966

(For Patent Operations Use Only) STAT

WITNESSED AND UNDERSTOOD BY

Signature of Witness

Date

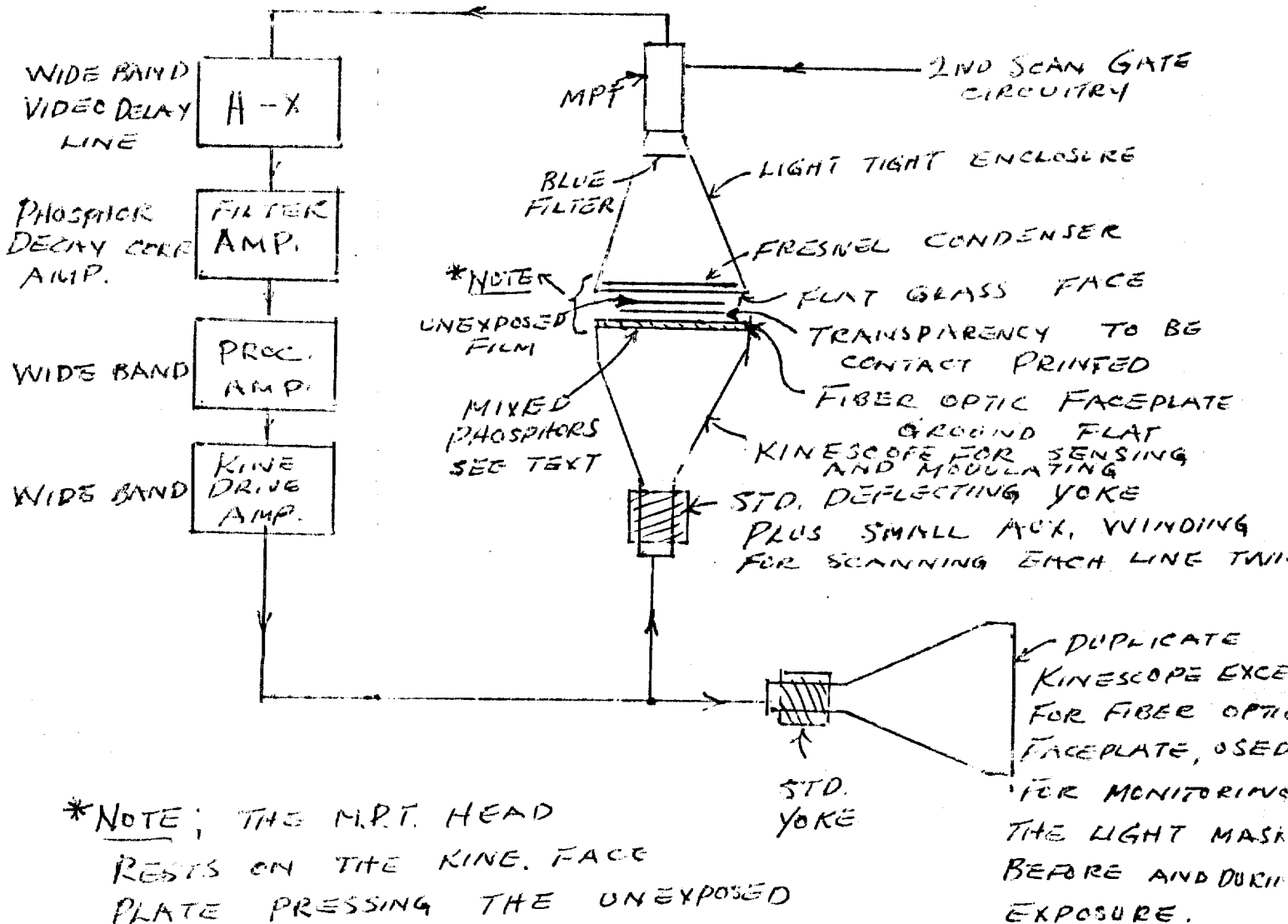
27 February 1966

Approved For Release 2004/08/25 : CIA-RDP78B04770A000600010008-8

## PATENT DISCLOSURE DATA SHEET

DESCRIPTIVE TITLE: *System for Electronically Processing photographic images*

## 3. DETAILED DESCRIPTION:



\*NOTE: THE M.P.T. HEAD RESTS ON THE KINE. FACE PLATE PRESSING THE UNEEXPOSED FILM AND TRANSPARENCY TOGETHER.

FOR OTHER DETAILS SEE   DCKET # 55788

FIG. 1

Feb 22, 1966

Date

(For Patent Operations Use Only)

WITNESSED AND UNDERSTOOD BY

27 February 1966

Date

**PATENT DISCLOSURE DATA SHEET**

Approved For Release 2004/08/25 : CIA-RDP78B04770A000600010008-8

For Patent Operations Use Only  
 (Date Received) **FEB 22 1966**  
 Docket No. **57,528**  
 Domestic Patents **3-1-66**  
 Patent Attorney: **Princeton**  
 Origin: **DEF (AERARL)**

The herein described invention is submitted pursuant to my employment agreement.

1. Date of this disclosure: **Feb. 22, 1966**
2. DESCRIPTIVE TITLE: **System for Electronically Processing Photographic Images**
3. PURPOSE, SUMMARY AND PROBABLE USES: To process photographic images so as to improve their perceptibility to human observers. The system employs a single kinescope with mixed phosphors in an open loop feedback system to produce modulated light for contact reproduction of the images. Another kinescope is used for monitoring the light mask for adjustment purposes. The probable use of the system is as a modulated light contact printer.

**Answer All Questions - Use N/A when Not Applicable - Submit Original - Keep Copy for Your Files**

4. Attached hereto is "Detailed Description" comprising Form Pat. 3010 ( **45** ) pages and the following papers, prints, samples, etc. **Fig. 1**
5. Invention described in part **11/2**, 19**64** in Engineering Notebook No. **19932** Pages **88**
6. Device constructed on \_\_\_\_\_, 19\_\_\_\_ 7. Shop Order # \_\_\_\_\_
8. Tested on \_\_\_\_\_, 19\_\_\_\_ 9. Test Witnessed by \_\_\_\_\_  
 Bldg. \_\_\_\_\_ Flr. \_\_\_\_\_ City and State \_\_\_\_\_ Tel. Ext. \_\_\_\_\_
10. State any plans for use of the invention **May be implemented based on a future proposal.**  
 May be of interest to \_\_\_\_\_
11. If this invention has been described in any publication or report, identify: \_\_\_\_\_
12. Was invention *either* (a) conceived or (b) *first* actually reduced to practice in the course of or under Government Contract(s) or Subcontract(s)? (a) Yes **x** No \_\_\_\_\_ If "Yes," give date: **Nov.**, 19**65**.  
 (b) Yes \_\_\_\_\_ No \_\_\_\_\_ If "Yes," give date: \_\_\_\_\_, 19\_\_\_\_ (See explanation on reverse side)
13. If answer either to 12(a) or 12(b) is "Yes" list contract(s) or subcontract(s) numbers:  
 (a) **No. 03** (b) **(100,762)65-R**
14. Is the invention embodied in any material either (a) furnished or (b) to be furnished under Government Contract(s) or Subcontract(s)? (a) Yes \_\_\_\_\_ No **x** (b) Yes \_\_\_\_\_ No **x** Proposal maybe submitted and later answer may be "yes".
15. If answer either to 14(a) or 14(b) is "Yes" list contract(s) or subcontract(s) numbers:  
 (a) \_\_\_\_\_ (b) \_\_\_\_\_
16. Security classification of the Invention **Not classified.**  
 (If any part of this disclosure is classified, the disclosure should be appropriately stamped and transmitted under security procedures.)

17. (1) Full Name \_\_\_\_\_ Citizen of **USA**  
 Home Address \_\_\_\_\_  
 Street \_\_\_\_\_ City \_\_\_\_\_ County \_\_\_\_\_ State \_\_\_\_\_  
 Occupation No. **22503** Occupation Title **Research Engineer**  
 (2) Full Name \_\_\_\_\_ Citizen of \_\_\_\_\_  
 Home Address \_\_\_\_\_  
 Street \_\_\_\_\_ City \_\_\_\_\_ County \_\_\_\_\_ State \_\_\_\_\_  
 Div. or Subsidiary \_\_\_\_\_ Bldg. No. \_\_\_\_\_ Flr. \_\_\_\_\_ City & State \_\_\_\_\_ Tel. Ext. \_\_\_\_\_  
 Occupation No. \_\_\_\_\_ Occupation Title \_\_\_\_\_

18. Sign full name(s) (1) \_\_\_\_\_ (2) **Feb 22, 1966**

**SPACE BELOW RESERVED FOR WITNESS**

(An effort should be made to obtain the signature of the person to whom the inventor(s) first disclosed the invention)

19. The invention was first explained to me by the above identified inventor(s) on **22 February**, 19**66** and is understood by me \_\_\_\_\_  
 Signature of Witness \_\_\_\_\_ Date of Signature **27 February**, 19**66**  
 Name of Witness ('Type or print') \_\_\_\_\_  
 Location: City \_\_\_\_\_ State \_\_\_\_\_

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PAGE 2

## PATENT DISCLOSURE DATA SHEET

7, STAT

DESCRIPTIVE TITLE: System for Electronically Processing Photographic Images.

3. DETAILED DESCRIPTION: This system evolved as a result of a study of ways to fulfill the requirements of Project 36 and its extension, the present PIP program.

The system to be described is similar to that described in [ ] Docket #55788 except that it is a printer (9 in. x 9 in. or larger) rather than a small area viewer. A second kinescope is used to monitor the printing process.

In automatic dodging systems using a kinescope for the modulated light source it has been customary to use negative feedback in a closed loop system to provide the necessary negative light mask. Such systems are limited as to the resolution of the light mask because the video bandwidth of the system must be kept low to prevent system oscillation. A few hundred kilohertz is usually the top frequency used; see the [ ] sales publica- STAT  
The problem could be minimized using a very low TV frame scanning rate as in slow scan TV systems, but this makes the printer operate too slowly for its intended use.

Wide band, higher speed systems have been disclosed, see [ ] docket #55788, using time sharing on a line by line basis and has the advantage of inherently good registration between the light mask and the transparency which produced it.

Similar systems have been disclosed, see [ ] docket #56280, using two more kinescopes in systems which require precise registration of the scanning rasters. Such systems are also described in [ ] page III-1 and III-3, and in the First Interim Technical Report, issued Dec. 16, 1965 prepared for the U.S. Government [ ] Task Order #03(100,762)65-R, by the [ ]

Please refer to Fig. 1. As may be observed, this system has no projection lenses, mirrors, or light splitters. Both sensing and modulating are done in one kinescope using the same scanning raster for both. The kinescope is one large enough to accommodate a 9 in. x 9 in. transparency, diagonal 12.6 in.; say, a 14 in. diameter tube, or larger, round or square. On the face is a mixture of phosphor consisting of the yellow component of silicate P-11 and P-16 in the ratio of about 10 of yellow to 1 of violet, but this ratio is not critical. It depends on the exposure characteristics of the un-exposed film to be used in the printer.

The faceplate of the kinescope on which the phosphor mixture\* is deposited in a fiber optic one, ground flat, and made with 1000 fibers to the inch, more or less.

The transparency to be contact printed is placed in direct contact with the fiber optic faceplate, emulsion side out. The unexposed film is placed in contact with the transparency, emulsion to emulsion, and the MPT (multiplier phototube) head including the light condensing system is made to rest upon them, pressing them tightly together. Pressure pads may be used but good results have been achieved over smaller areas without them.

\*It may be a homogeneous mixture or a layer process. The [ ] Tube Division has made 5 in. diam. tubes on standard faceplates which worked as part of Project 36.

Signature(s) of Inventor(s)

Date

Feb 22, 1966

WITNESSED AND UNDERSTOOD BY

Signature of witness

Date

24 February 1966

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## PATENT DISCLOSURE DATA SHEET

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DESCRIPTIVE TITLE: System for Electronically Processing Photographic Images.

## 3. DETAILED DESCRIPTION:

A negative mask is used for the modulated light source according to well known dodging techniques, although a positive mask or a combination of the two could be used.

An advantage of the time sharing principle, to be described next, is that the feedback loop is never closed, thus, oscillations due to overall feedback cannot take place. Another advantage is that the video delay line may be made H-X, where H is the time of one scanning line and X is the overall system delay. Thus the system delay in the horizontal direction is compensated. Vertical compensation is described later.

Although the TV frame rate should be as high as possible, consistent with operating speed, flicker is no problem here as it is in a viewer. The frame rate may, therefore, be less than 60 per second. This makes for higher vertical resolution based on a given horizontal resolution and bandwidth.

The time sharing principle is, as follows: During scan #1, no modulation appears on the kinescope because the delay line delays for that time. During scan #2 the input to the delay line is cut off and the result of scan #1 appears as modulation on the kinescope. It is assumed that during scan #1 the kinescope brightness is lower than for scan #2 so that the sensing scan does less exposing than the modulated scan. During scan #2 the vertical centering is shifted upward an amount equal to the distance between lines so that scan #2 retraces the path of scan #1.

Scan #3 comes in at its normal position, senses the picture similar to #1, and scan #4 retraces scan #3, etc. Thus, only half the number of scanning lines is available for vertical resolution as if no shifting took place. In a system with resolution of 1000 lines to the inch or more, the vertical misregistration error due to not shifting alternate lines would be so low as to not affect the image perceptibility improvement appreciably, but for lower resolution shifting would be desirable.

Vertical and horizontal rates, based on conventional sawtooth scanning, on which this disclosure is based, are chosen so that the resolution is equal in both directions. The maximum mask resolution required for dodging high resolution transparencies is under study with the present laboratory bread-board setup of the two kinescope registered system. Having determined this, the other parameters fall in line in this order: (1) Kinescope spot size, (2) system bandwidth, (3) horizontal scanning rate, and (4) vertical scanning rate.

If after following this technique, line structure appears in the printed copy, the vertical frame rate may be reduced an additional amount, increasing the number of scanning lines to the point where they are indistinguishable, or vertical spot wobble may be used. A higher rate with reduced vertical resolution may be used for preliminary adjustment purposes.

The 2nd scan gate circuitry and a way of scanning each line twice is described in        docket 55788.

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Date

Date

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PAGE 1

**PATENT DISCLOSURE DATA SHEET**

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**DESCRIPTIVE TITLE:** System for Electronically Processing Photographic Images.**3. DETAILED DESCRIPTION:**

The monitor kinescope for adjustment purposes may be one having essentially the same electrical and brightness characteristics as the main kinescope.

System Advantages

1. Inherently good registration in a simple, compact mechanical design.
2. Higher operating speed than in low bandwidth systems.
3. Higher resolution mask capability than in lower bandwidth systems.
4. Provision for additional enhancing without system oscillation.
5. Correction for system delay.

System disadvantages:

1. Cost. The fiber optic faceplate and the wide band video delay line are both expensive.
2. Lack of individual brightness controls of the two phosphor brightnesses not present in the two kinescope systems.

It seems to me, without having implemented exactly the system disclosed, that the advantages outweigh the disadvantages.

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Signature(s) of Inventor(s)

Date

Feb 22, 1966

WITNESSED AND UNDERSTOOD BY

Signature of Witness

Date

27 February 1966

(For Patent Operations Use Only)

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**PATENT DISCLOSURE DATA SHEET**

DESCRIPTIVE TITLE: System for Electronically Processing Photographic Images

### 3. DETAILED DESCRIPTION:

